SIGNATURE RECOGNITION USING FUZZY-GENETIC ALGORITHM BASED REASONING

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By

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Abstract

Signature recognition is an area which has been exposed to vast amount of research works, with diversity of directions. Signature recognition can be divided into two main areas depending on the data acquisition method: on-line and off line signature recognition. From the subject of machine recognition of handwritten signature methods, the online recognition systems can acquire time dependant information like writing acceleration, pressure and pen moment in addition to the resulting signature. Therefore the online recognition systems give excellent recognition results. But, timely dependant local feature details are not available in the offline systems. Since offline signature recognition remains important in variety of applications. The machine recognition of the signature is a very special and difficult problem. The allied constraints arise due to the complexity of signature patterns, the wide variations in the patterns of a single person (i.e. inter personnel variations) and the forged signatures produced by the alleged forgers. The application areas for signature recognition include all the applications where handwritten signatures are already in use such as in the bank transactions, credit card operations or authentication of a document with important instructions or information.

In this study, I proposed a method based on the fuzzy logic and genetic algorithm (GA) methodologies. It consists of two phases; the fuzzy inference system training using GA and the recognition. A sample of signatures is used to represent a particular person. The feature extraction process is followed by a selective preprocessing. The fuzzy inference system is followed by a feature extraction step. The projection profiles, contour profiles, geometric centre, actual dimensions, signature area, local features, and the baseline shift are considered as the feature set in the study. The input feature set is divided into five sections and separate five fuzzy subsystems were used to take the results. Those results are combined using a second stage fuzzy system. The fuzzy membership functions are optimized using the GA. A set of signatures consisting of genuine signatures, random forgeries, skilled forgeries of a particular signature and different signatures were used as the training set. Then, that particular optimized recognition system can be used to identify the particular signature identity. The recognition results authenticate that this is a reliable and accurate system for off-line recognition of handwritten signatures.